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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/602,746 | 06/24/2003 | Brian G. McGee | 02-580 | 9979 |
| 719 | 7590 | 12/28/2004 | EXAMINER | |
| CATERPILLAR INC. 100 N.E. ADAMS STREET PATENT DEPT. PEORIA, IL 616296490 | | | SOLIS, ERICK R | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 3747 | |

DATE MAILED: 12/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/602,746

Applicant(s)

MCGEE ET AL.

Examiner

Erick R Solis

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 October 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-5,8,10,13-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Yang (US Patent 6390054). This reference teaches transitioning between two types of engine fuel injection modes. During transitioning some of the cylinders operate in a first mode while others are switched to the second mode. Eventually, all the cylinders are switched to the second mode. See col. 4, lines 35+ and also col. 6, lines 6-17.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out

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the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 6,7,9,11,12 and 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yang. Yang applies as above, but does not teach applying the technique of transitioning between different injection modes wherein one of the two combustion modes includes two injections (shots) per combustion cycle, nor use in a rotary type engine. As is known by applicant (see background discussion in applicant's specification) the use of multiple injections per engine cycle is well known. It would have been obvious to one of ordinary skill in the art to have modified a known multiple injection per cycle engine to have transitioned to single injection mode by using the technique taught by Yang wherein the cylinders or cylinder groups were progressively switched from one mode to the other, because this would have reduce torque shocks. Furthermore, it would have been obvious to apply the technique to a known rotary engine for the same reasons of minimizing torque shocks when transitioning between injection modes.

Response to Arguments

6. Applicant's arguments filed on 1 October 2004 have been fully considered but they are not persuasive. In particular, the thrust of applicant's argument regarding the 35 USC 102 rejection of claims 1-5,8,10 and 13-17, as being anticipated by Yang ('054) and the 35 USC 103 rejection of 6,7,9,11,12 and 18-20 as being obvious over Yang is directed to the argument that the applied Yang ('054) reference does not teach injection. Applicant does recognize that

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Yang ('054) is silent regarding how fuel is directed to the combustion chamber it does incorporate by reference US Patent application 09/470,359 (now US Patent 6295973, also to Yang). The examiner, however disagrees with applicant's position that this incorporated reference Yang ('973) only teaches that fuel and air are pre-mixed in the intake manifold in an HCCI engine. Applicant's attention is directed to col. 1, lines 25-28, which states that the homogeneous air/fuel mixture is created either in the intake manifold or in the cylinder by early fuel injection. The part which states that the air-fuel mixture is created **in the cylinder by early fuel injection** supports the argument that Yang('054) also teaches injection of fuel and also direct injection of fuel into the cylinder. Therefore, based on this the examiner is maintaining the rejection. Further the examiner has cited two additional prior art references which teach that HCCI combustion is known in which fuel is directly injected into the cylinder. See Patent Application Publication 2002-0157619 and 2002-0059907.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Patent Application Publication 2002-0157619 (paragraph 9) and 2002-0059907 (paragraph 16).

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO**

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MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Erick R Solis whose telephone number is (571) 272-4853. The examiner can normally be reached on Monday-Thursday.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571) 272-3700.


Erick R Solis
Primary Examiner
Art Unit 3747

ers
December 21, 2004